Situation Update on Malaria in Myanmar

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AGENDA

- Mortality and Morbidity of Malaria in Myanmar
- Myanmar Strategic efforts in recent decade
- Malaria Background information
- Behaviours of Myanmar Population in treating malaria and
- Challenges of eliminating Malaria in Myanmar
- Conclusion

Key Objectives

- To introduce how one of the most **deadliest** and **prevalent** disease, malaria's, trend and past efforts in Myanmar
- To understand the **nature** of malaria disease
- To present the situation of malaria by analyzing past behaviours of the populations, histories of malaria, epidemiological knowledge, international measures, and the challenges during recent instability development of the country

How prevalent **malaria** is in **Myanmar**?

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Nearly

32 Millions out of **53.4 millions** of People are at risk of malaria in Myanmar ("Myanmar," n.d.).

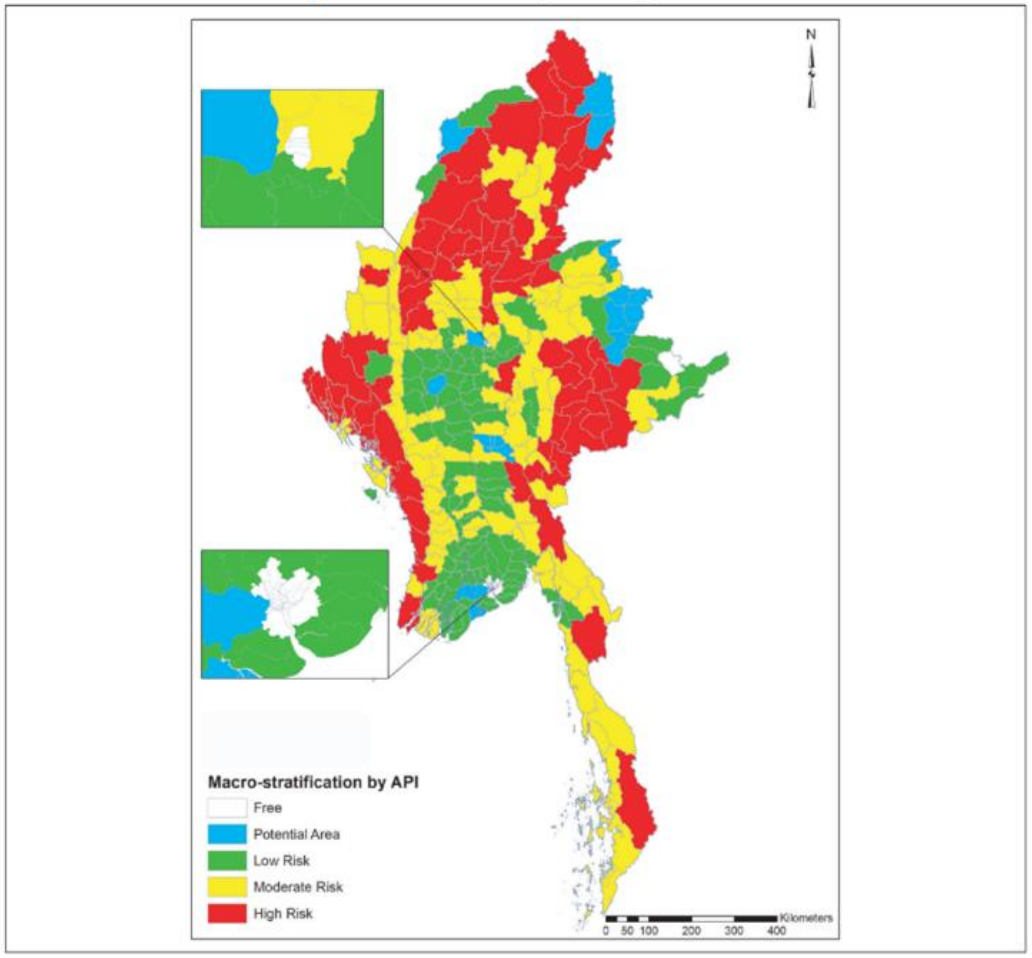
WHY is it important to have a knowledge of malaria?

https://malariajournal.biomedcentral.com/articles/10.1186/s12936-016-1623-9

Myanmar is **strategically** located in the **tropical** place. Tropical or subtropical climate is the preference condition for the parasite that cause malaria Gubler et al., 2001;

Koenraadt et al., 2004

Figure 6. Stratification by townships – 2015



Source: VBDC 2015

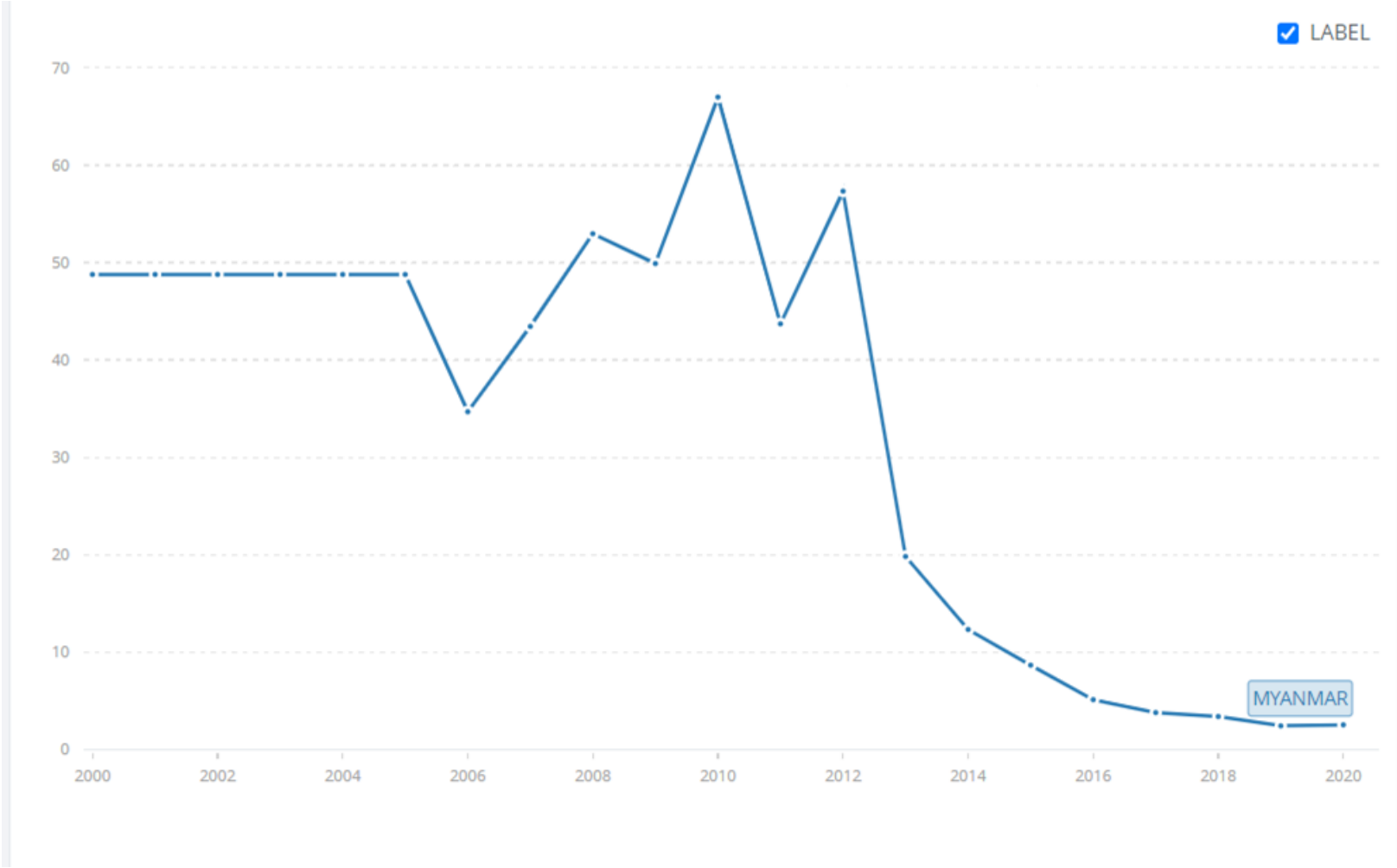
However, other non-climate factors also make malaria transmission high,

- parasites
- vectors
- human host factors
- migration
- interruption of control and preventive measures

(Kumar & Neelapu, 2014).

Let’s get **updated** on elimination efforts/ control measures in recent decade

Malaria Confirmed Cases Trend in Myanmar 2010-2020



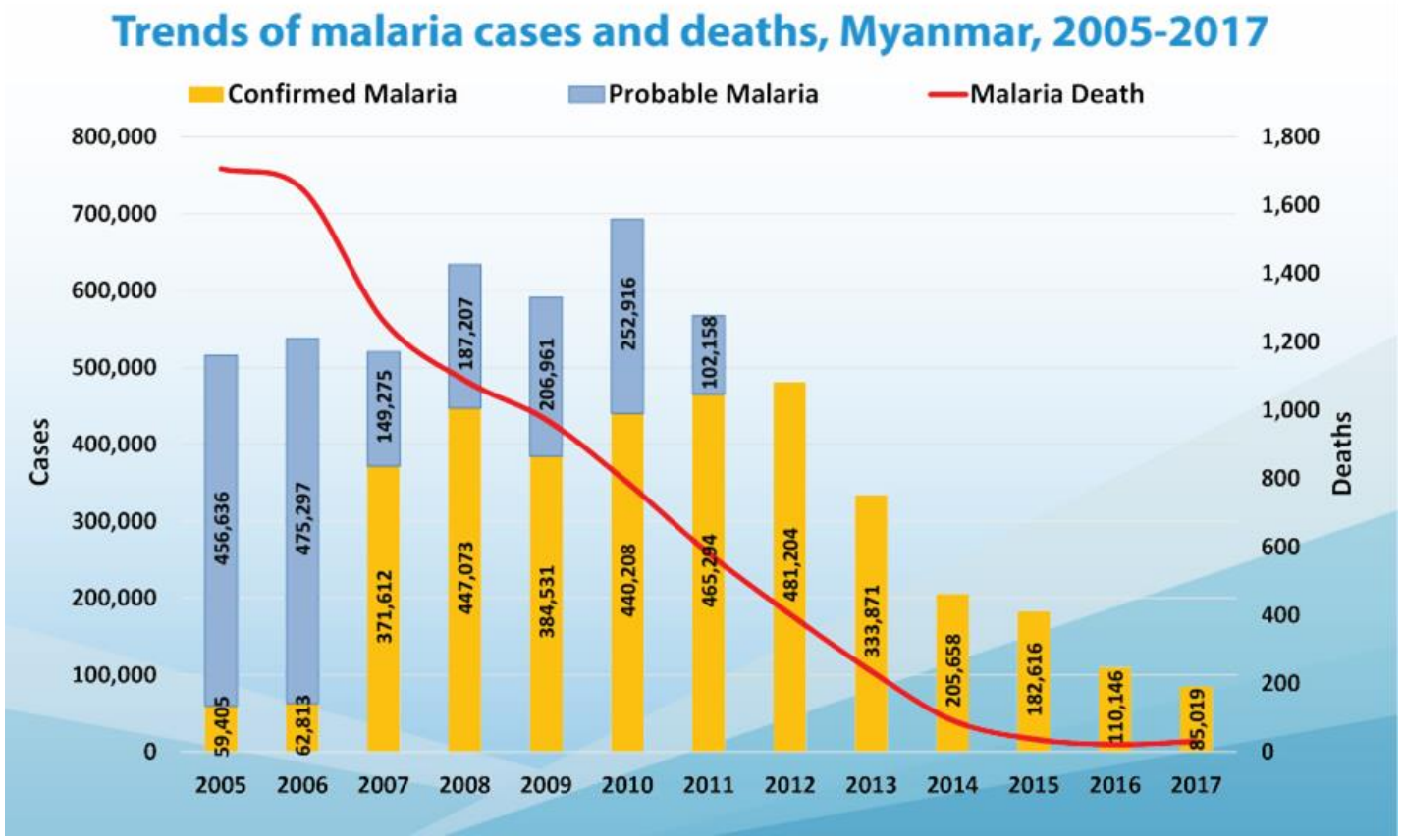
(World Bank, 2022)

Malaria **Trend** in Past Decade 2010-2020

- Cases declined from 440,208 in 2010 to 85,019 in 2017 (over 80% decrease)
- Death Rate significantly dropped from nearly 400,000 up to reach zero cases

What we can **infer** from these data is

- A dramatic **decrease** in malaria cases can be a result of malaria **control** efforts in the region.



Source: WHO

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Malaria National Strategic Plan 2016-2020

Three key interventions:

- Case detection and effective management
- Disease prevention
- Malaria case and epidemiological surveillance

Elimination Goals

1. Plasmodium falciparum malaria **by 2025**
2. all malaria from Myanmar by **2030**

External Support

- World Health Organization (WHO)
- the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GF),
- private entities, and
- non-governmental organizations

Case Study in Ayeyarwaddy

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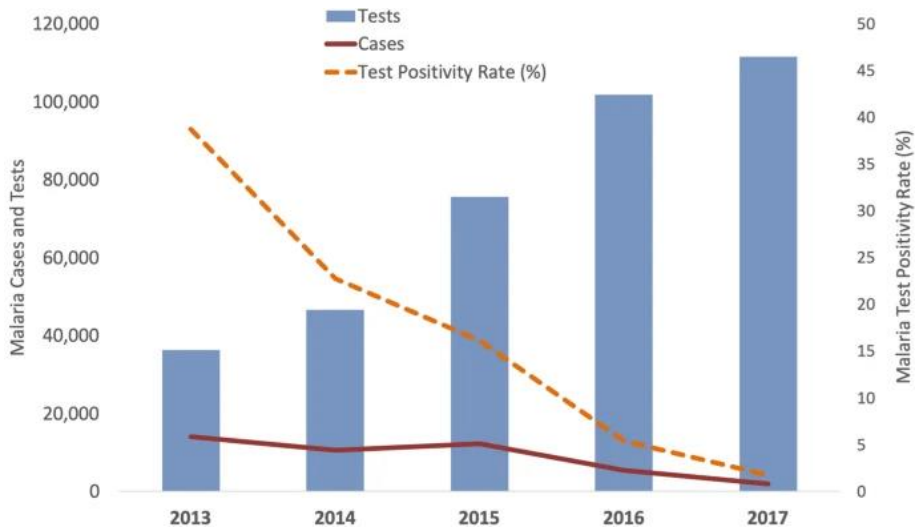
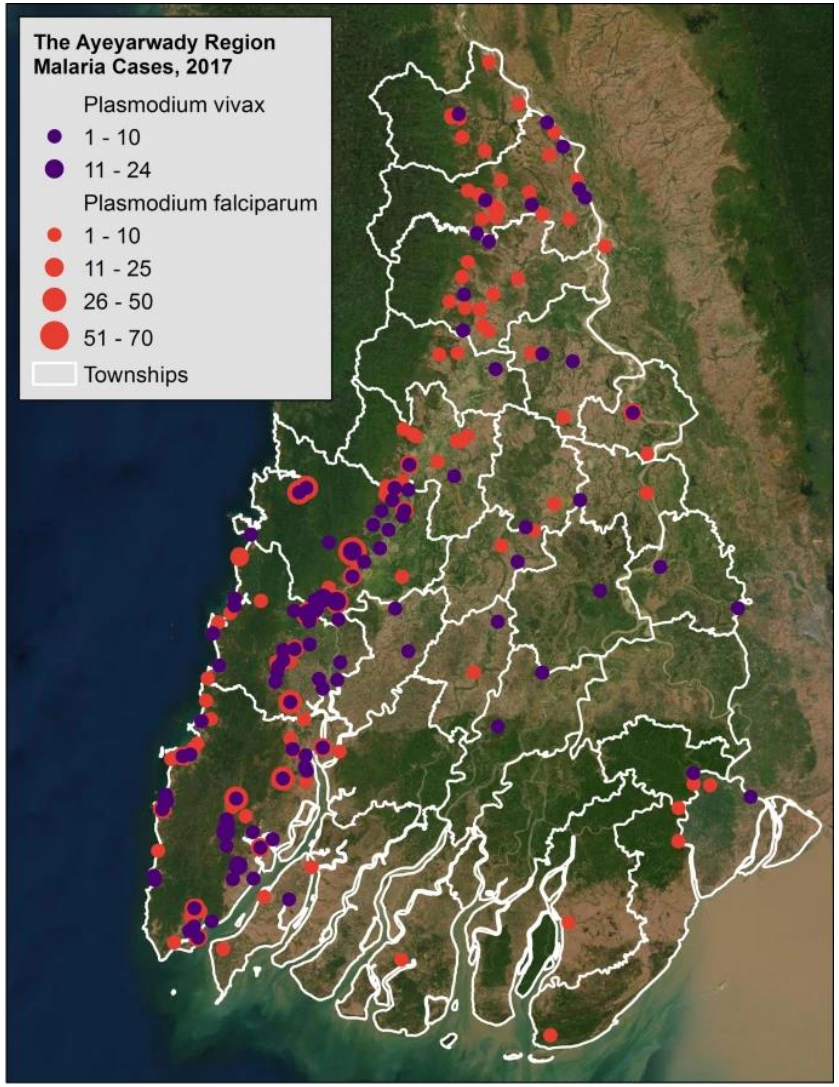
Between 2013 and 2017, confirmed malaria cases in Ayeyarwady declined 86% from 14,099 (n = 20 townships) to 1,919 (n = 26 townships).





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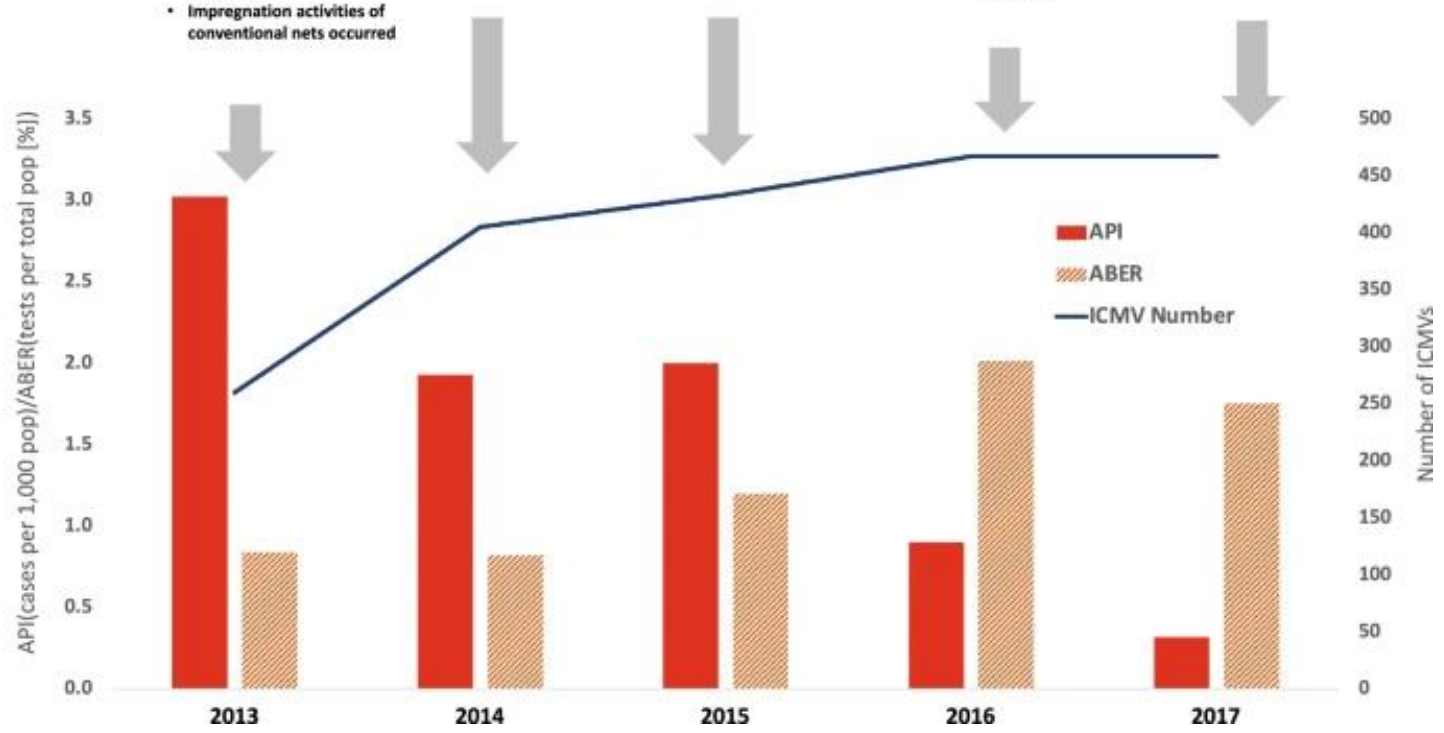
Elimination Efforts update in Ayeyarwady Region with NSP

	2013	2014	2015	2016	2017
Surveillance	Trainings encouraged BHS to improve paper reporting	Trainings encouraged BHS to improve paper reporting			Township level staff were trained to enter case data in Access-based surveillance system
Case Management	BHS received training on testing, diagnosis, and treatment	• BHS received training on testing, diagnosis, and treatment • ACT coverage under GF was extended to the region	• BHS received training on testing, diagnosis, and treatment • Guideline change: BHS were instructed to test all fevers • Guideline change: One-time PQ dose for PF at 1st dose of ACT	BHS received training on testing guidelines	BHS received training on testing guidelines
Vector Control	• LLIN continuous distribution ongoing • LLIN mass distribution occurred • Impregnation activities of conventional nets occurred	LLIN continuous distribution ongoing	LLIN continuous distribution ongoing	• LLIN continuous distribution ongoing • LLIN mass distribution occurred	LLIN continuous distribution ongoing



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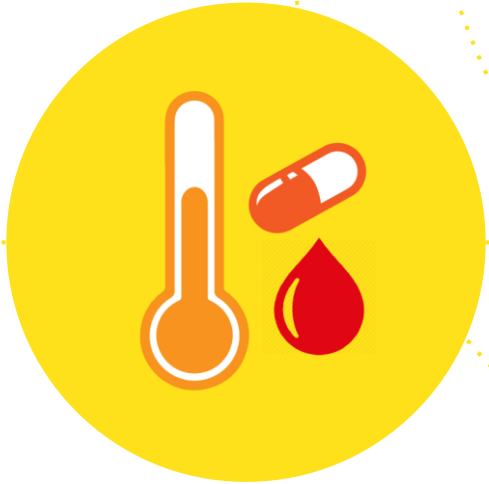
Case Study **Data** Analysis

Surveillance and data reliability

township-level health facility reporting has gone up from 70.77% in 2014 (SD 21.04) to 81.59% in 2017



Community case management

Between 2013 and 2017, the ICMV program increased from 260 to 467 ICMVs, and the number of tests done by ICMVs grew up from 3,231 in 2013 to 18,923 in 2017.

Vector control

a target population of 431,016 receive 204,439 LLINS in 2016 (87.39% coverage); in 2017, a target population of 371,486 got 183,460 more LLINs (88.89% coverage).

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Challenges faced during the national strategic plan

- Poor Community Knowledge on Health
- Inadequate Supplies
- Transportation Barrier
- Low Knowledge of Surveillance Activities
- Unable to Control Migrant Workers

(Aung et al., 2020)

Let’s learn more about

MALARIA

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Intro - History

biting midge 100 million years ago infected with oldest malarial strain

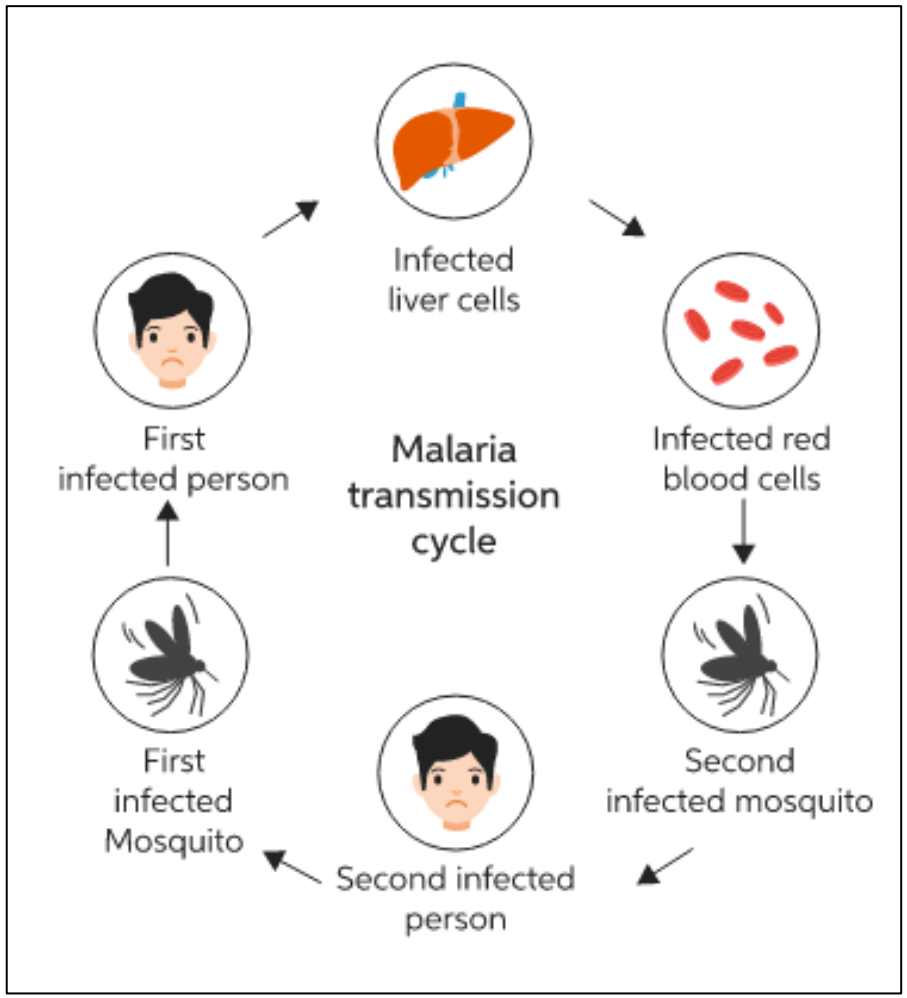
mosquito *Culex malariager* (15-20 million year ago) infected with the malarial parasite that is related to human malarial parasite

Time Line For Spread of Malaria
>10000 years ago
Malaria in Africa
10000-5000 years ago
Mesopotamia, the Indian peninsula and South-East Asia
5000 years ago
Malaria in China
3000 years ago
P. falciparum reaches India
2,500 - 2,000 years ago
Malaria reaches the Mediterranean shores
1000-500 years ago
Malaria reaches northern Europe
End of 15th century AD
Malaria reaches New World
Mid 18th century AD
Malaria spreads across North America
19th Century AD
Malaria almost all over the globe
Early 20th Century AD
Millions die of malaria almost all over the world
Early 1950s
Malaria almost disappears from North America and from almost all of Europe; deaths mainly in Africa

https://www.malariasite.com/history-parasites/

- Gradually achieved two-host life cycle
- Malaria caused by *P. falciparum*, *P. vivax*, *P. ovale*, *P. malariae*, and *P. knowlesi*, carried by blood sucking insects (WHO, 2022)

Transmission cycle and population at risk

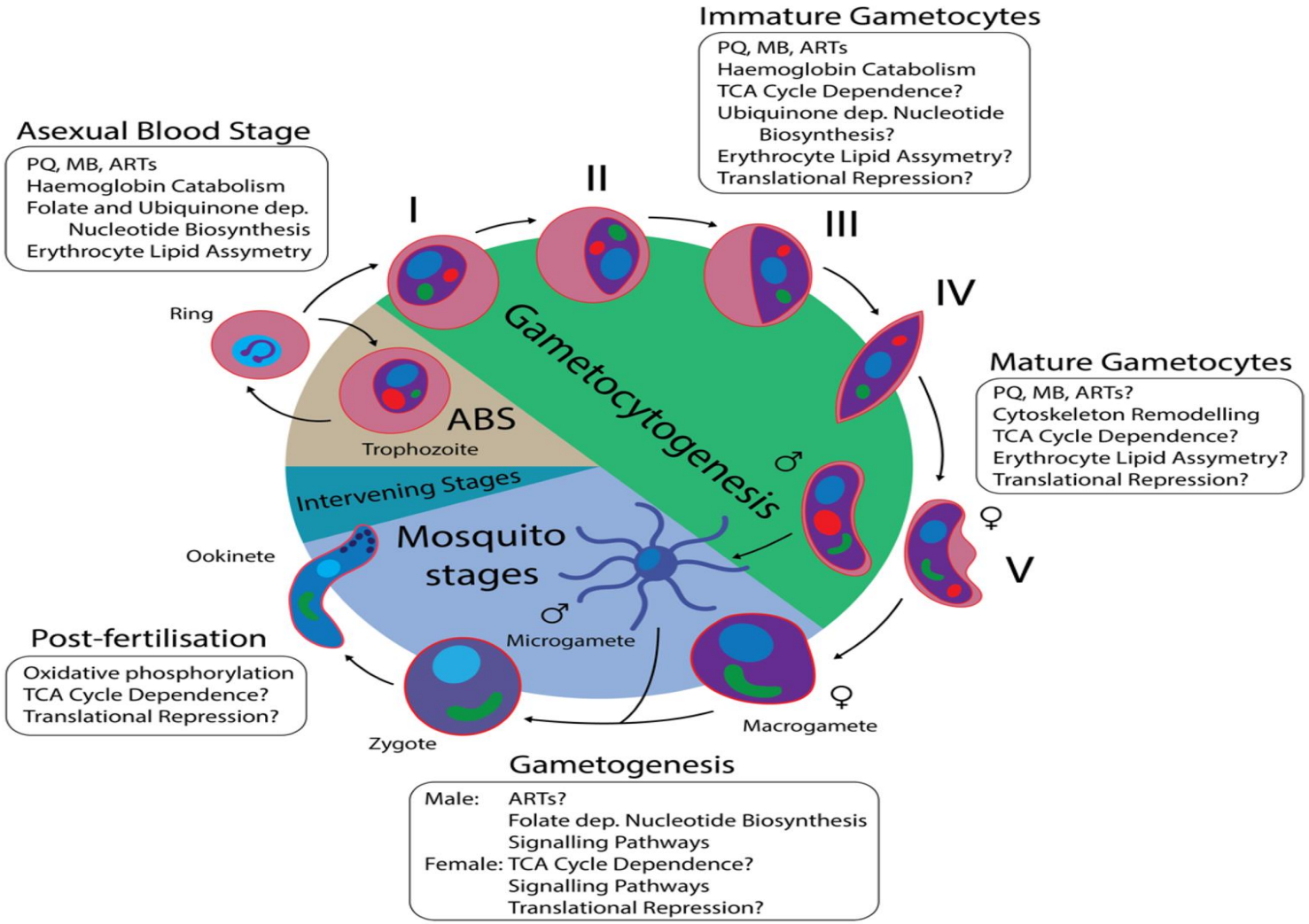


Children under 5, Pregnant women

Travellers, Migrant workers

Immunocompromised patients

(WHO, 2022)



https://www.chegg.com/learn/medicine-and-health/medical-terminology/vector-in-medical-terminology

https://www.mdpi.com/parasitologia/parasitologia-02-00011/article_deploy/html/images/parasitologia-02-00011-g001-550.jpg

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Malaria types and treatment

Uncomplicated Malaria

Intermittent fever, chills, shivering, headache, muscle and joint pain, body weakness, and vomiting

Falciparum →

Artemisinin Combination Therapy (ACT)

- Artemether-Lumefantrine
- Artesunate-Amodiaquine
- Dihydroartemisinin-Piperaquine
- Artesunate-Sulphadoxine-Pyrimethamine
- Artesunate-Mefloquine
- Artesunate-Pyronaridine (WHO, 2022)

→ **Primaquine single dose**

Vivax →

Chloroquine → **Primaquine * 14 days**

Severe Malaria

Impaired consciousness, convulsions, circulatory collapse, Jaundice, vital organ dysfunctions

→ **IV/IM Artesunate or Artemether Or ACT**

Vivax →

Treatment for clinical cure

Treatment for radical cure

MOH (2022), WHO (2022)

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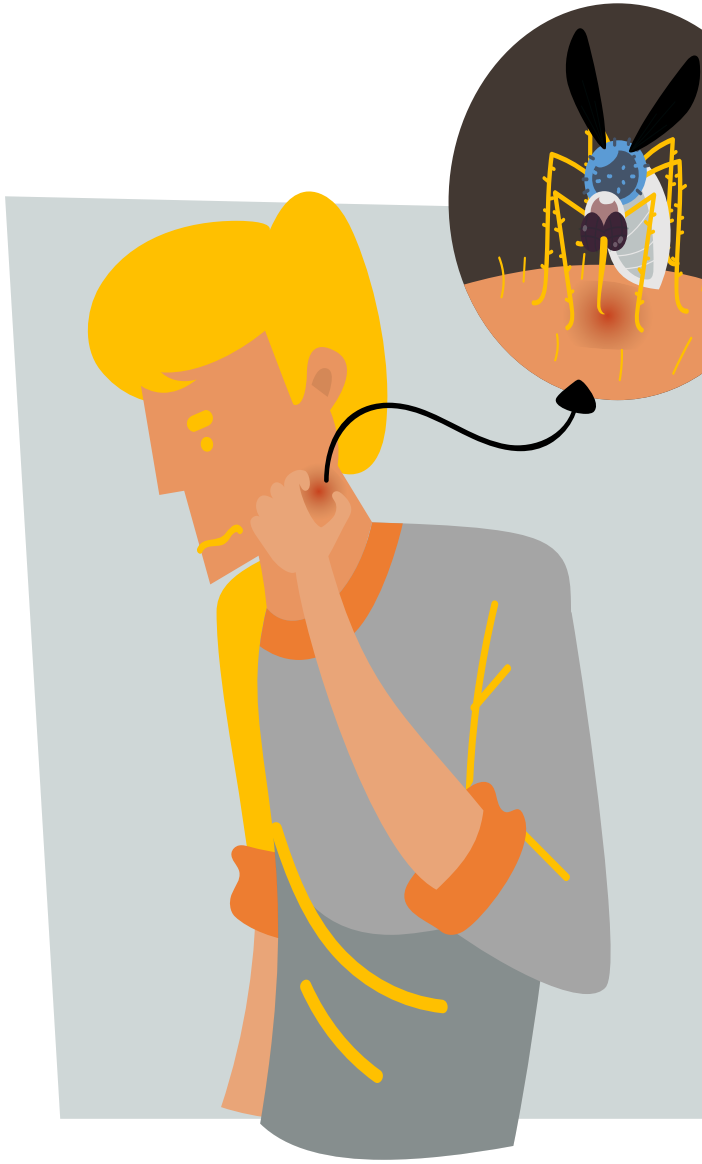
Asymptomatic reservoirs of Malaria

In the 2013 study in Bago, **93%** (n= 38) of malaria positive participants were afebrile and asymptomatic

- **26% (n= 5)** of malaria-positive (P. falciparum) afebrile and asymptomatic participants were found to have K13 mutation (Ghinai et al., 2017)



Qing Hao Su (Artemisinin) resistance in Falciparum

- Kelch 13 gene - the primary marker of artemisinin resistance
  - Associated with longer duration for Artemisinin to clear parasites
- Substantive amount of K-13 mutations were found across Upper Myanmar and eastern border areas in 2013-14 study on symptomatic patients from ten administrative regions (Tun et al., 2015)

Chemoprophylaxis

- International travellers recommended to take prophylaxis
- Locales are encouraged to bring RDT and ACT+Primaquine as a standby treatment

MOH (2022)

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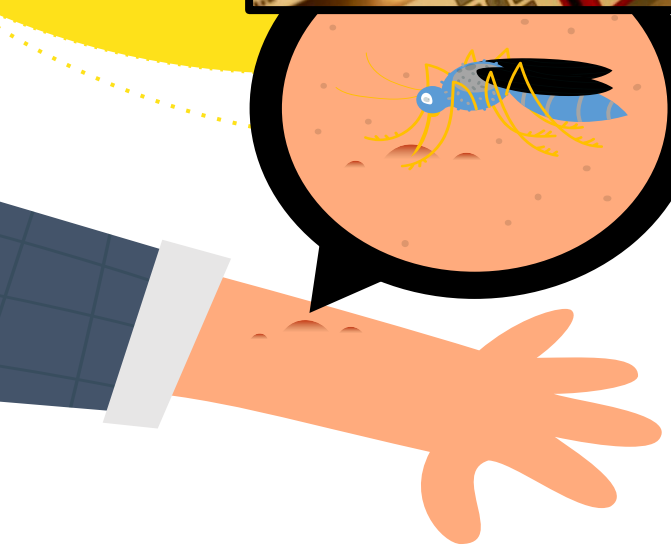
Accessible testing

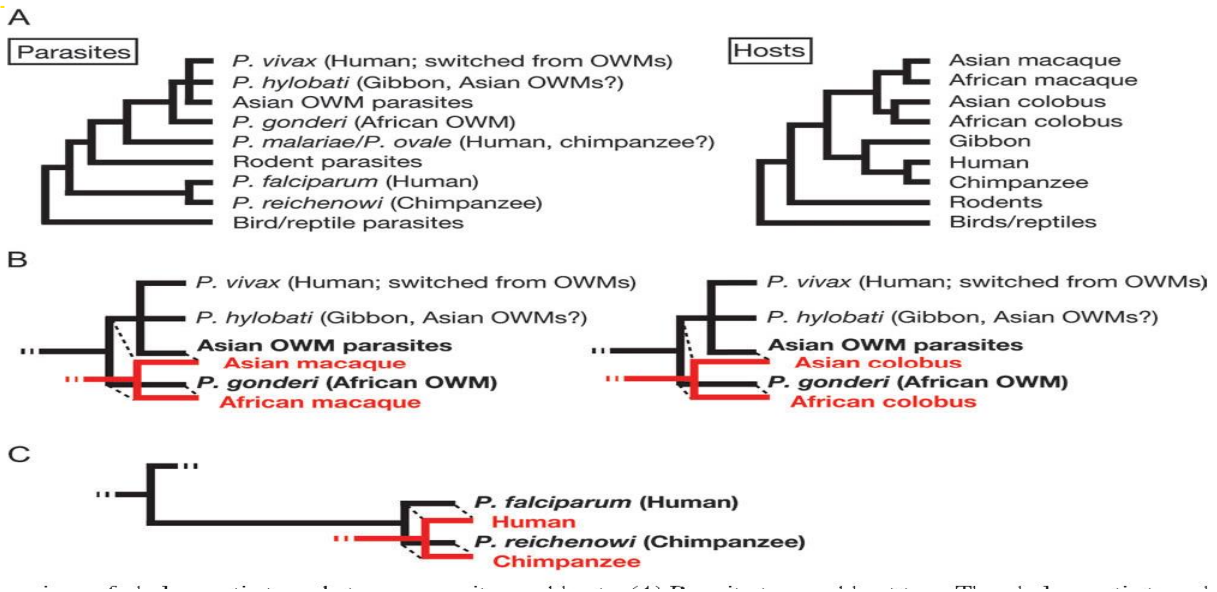


- Available tests are Rapid Diagnostic Testing for certain species
- Polymerase Chain Reaction (PCR) is required to check resistance gene as well as identifying malarial parasites species
- In the 7 year observational study from 2014-21, **80% (n = 598,435)** of malaria-suspected patients received negative results for either falciparum or vivax (Rae et al., 2022)
- In 2013 Bago study, 1% (n=16) of positive results were due to P. knowlesi (Ghinai et al., 2017)

Zoonotic P. knowlesi

- primarily only infects non-human primates (macaque monkeys)
- simian P. knowlesi in human cases recorded in Myanmar (Zaw & Lin, 2019)
- Other simian malaria might adapt to humans

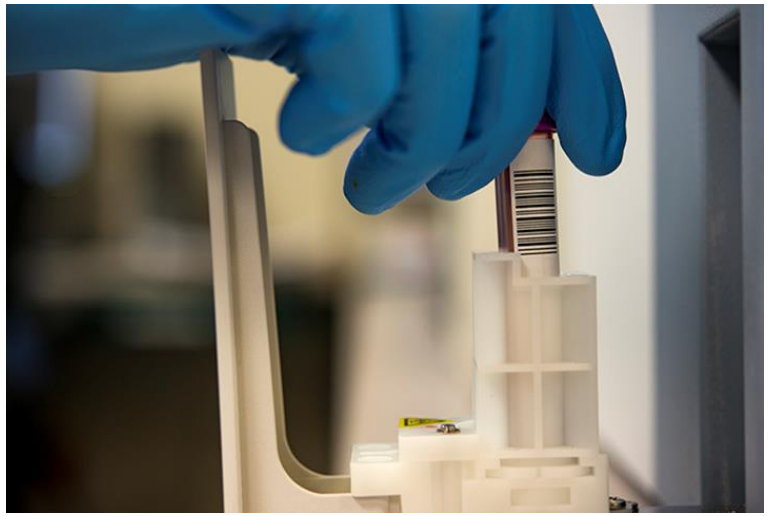
RAPID DIAGNOSTIC TEST FOR WHICH SPECIES???



Malaria co-evolution with its hosts

Genetic disease burden by Malaria

- Malaria is known to have selection pressure for genetic defects in red blood cells (Thalassemia, Glucose-6-phosphate dehydrogenase deficiency, and sickle cell anemia) (Nosten et al., 2022)
- G6PD prevalent in Karen population and also found in other national groups (Bancone et al., 2014; Han et al., 2021)
- Dose of Primaquine used to eliminate gametocytes has to be avoided due to acute hemolytic anemia



WHY NO G6PD TESTING???

So, what are the contextual **health behaviours** found in *Myanmar?

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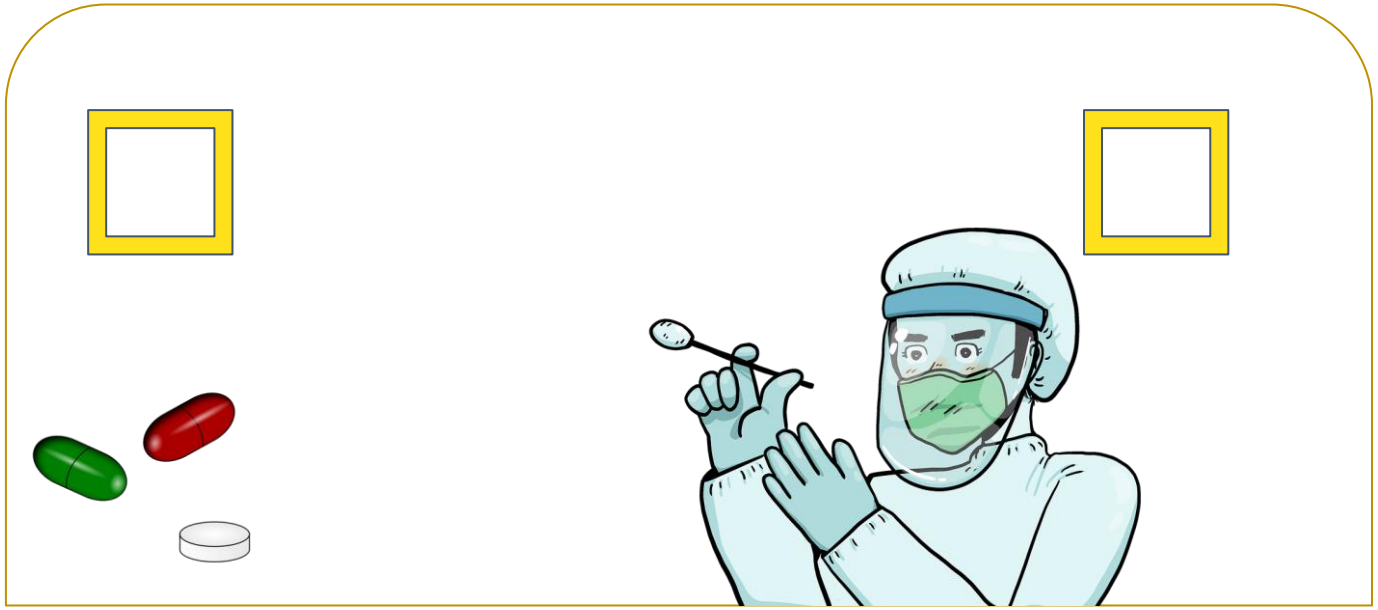
“Seeking help in home”



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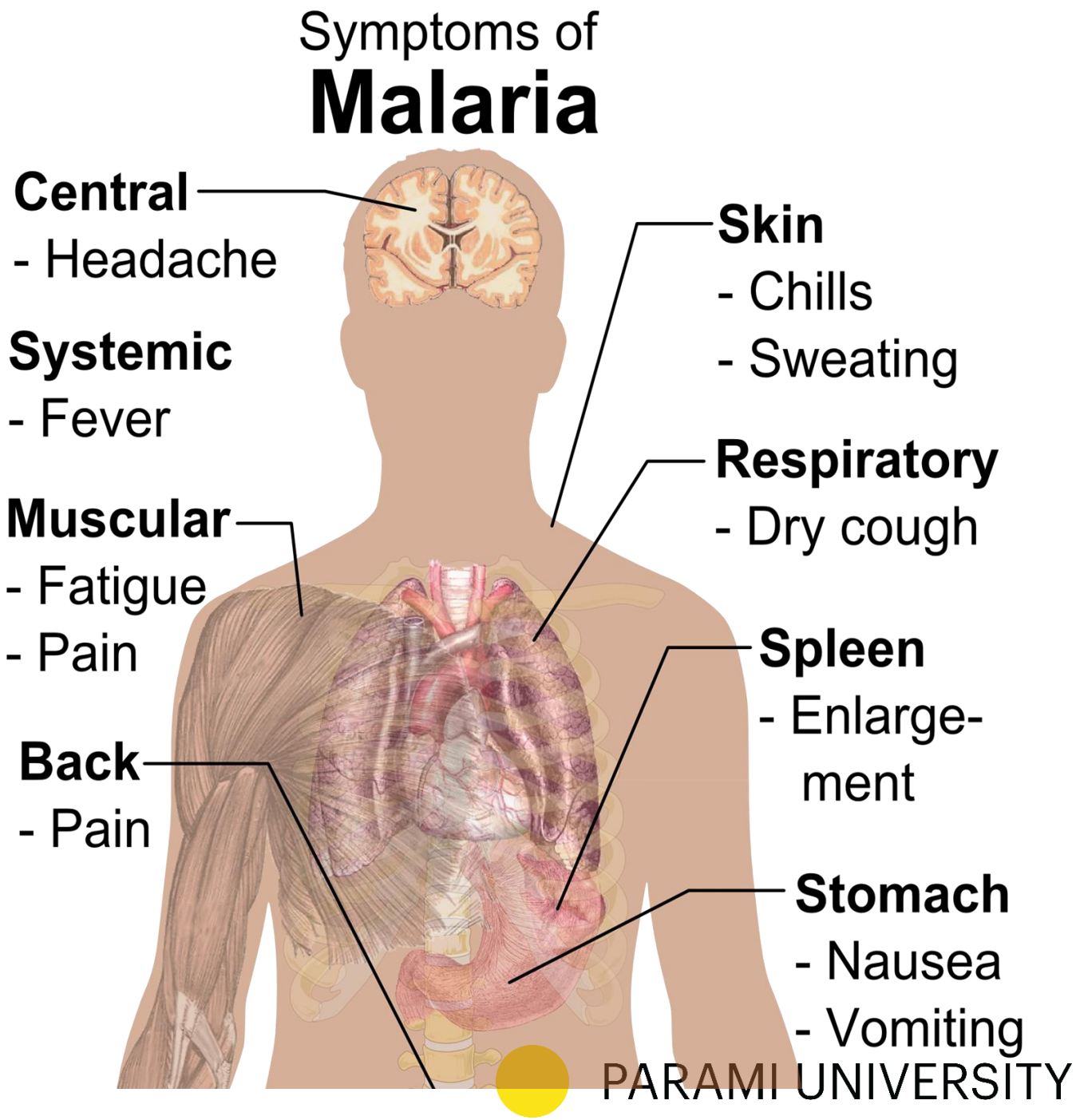
What is malaria?

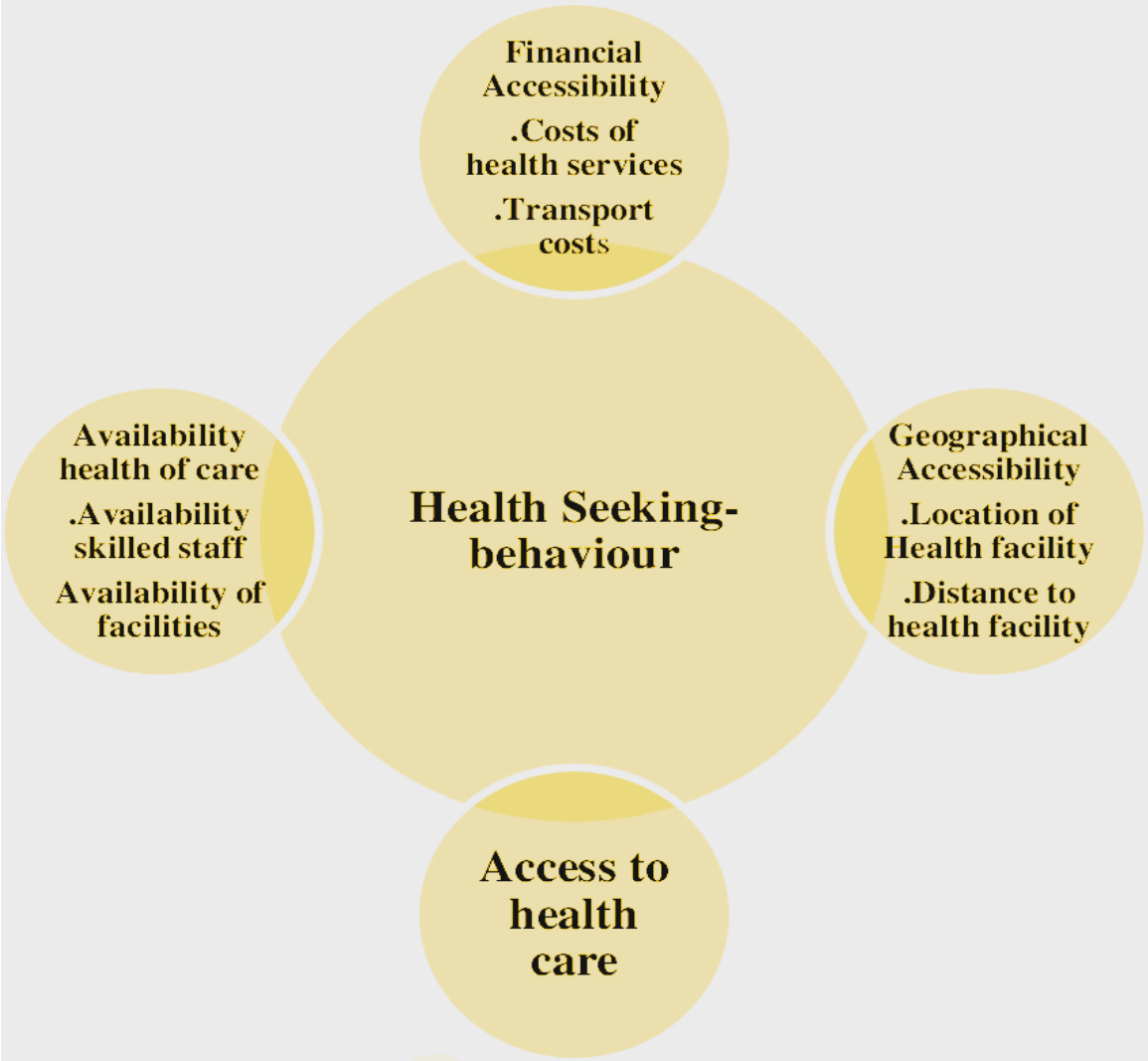
“ Life threatening disease caused by parasites that are transmitted through the bites of infected female Anopheles mosquitoes” - WHO



Health-seeking behaviour

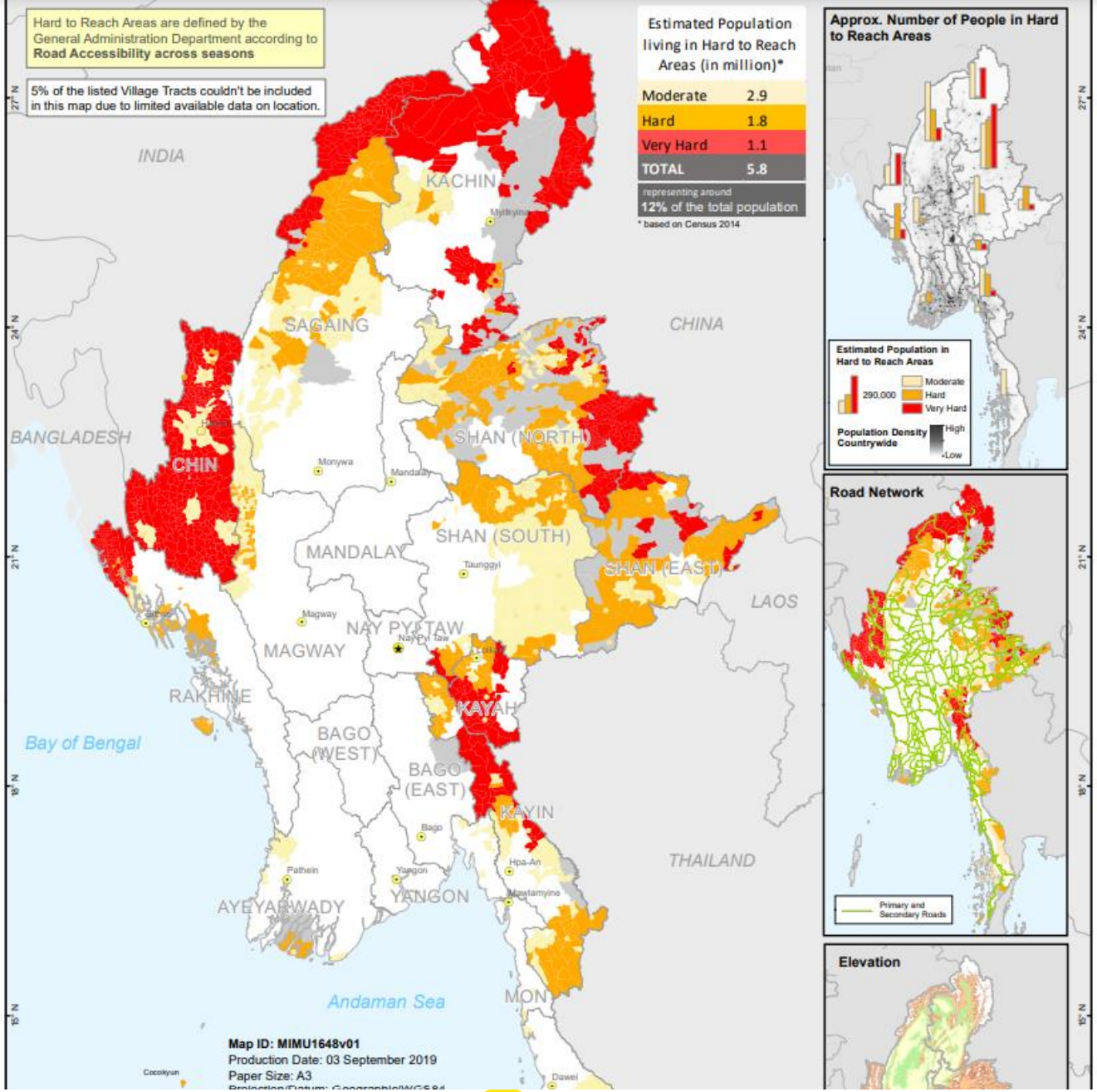
- *socio-economic status*
- *availability of transportation*
- *availability of health facilities*
- *family income*
- *location of residents*

(Aung et al., 2016)



What factors are responsible for health-seeking behaviour change?

- *inaccessible healthcare system*
- *blockade of medical aids to particular regions*
- *Country's infrastructure*



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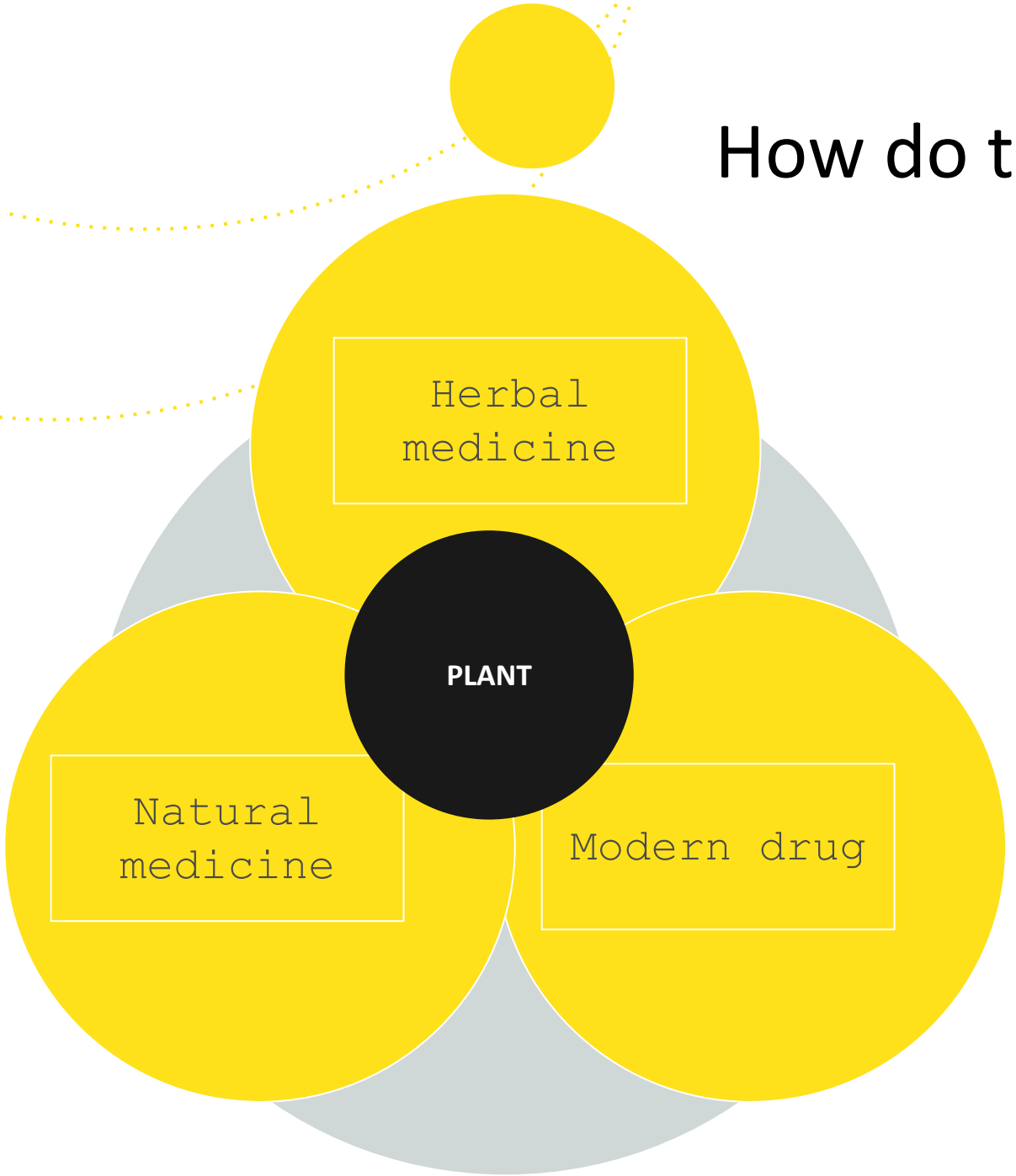
- **Intervention**
  - Long lasting insecticidal nets (LLIN)
  - Wearing Long sleeves clothes
  - Insect repellent
  - Raising awareness

How do they treat **symptoms**?



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Home remedies

Ginger

- vomiting
- nausea

Krishna musali

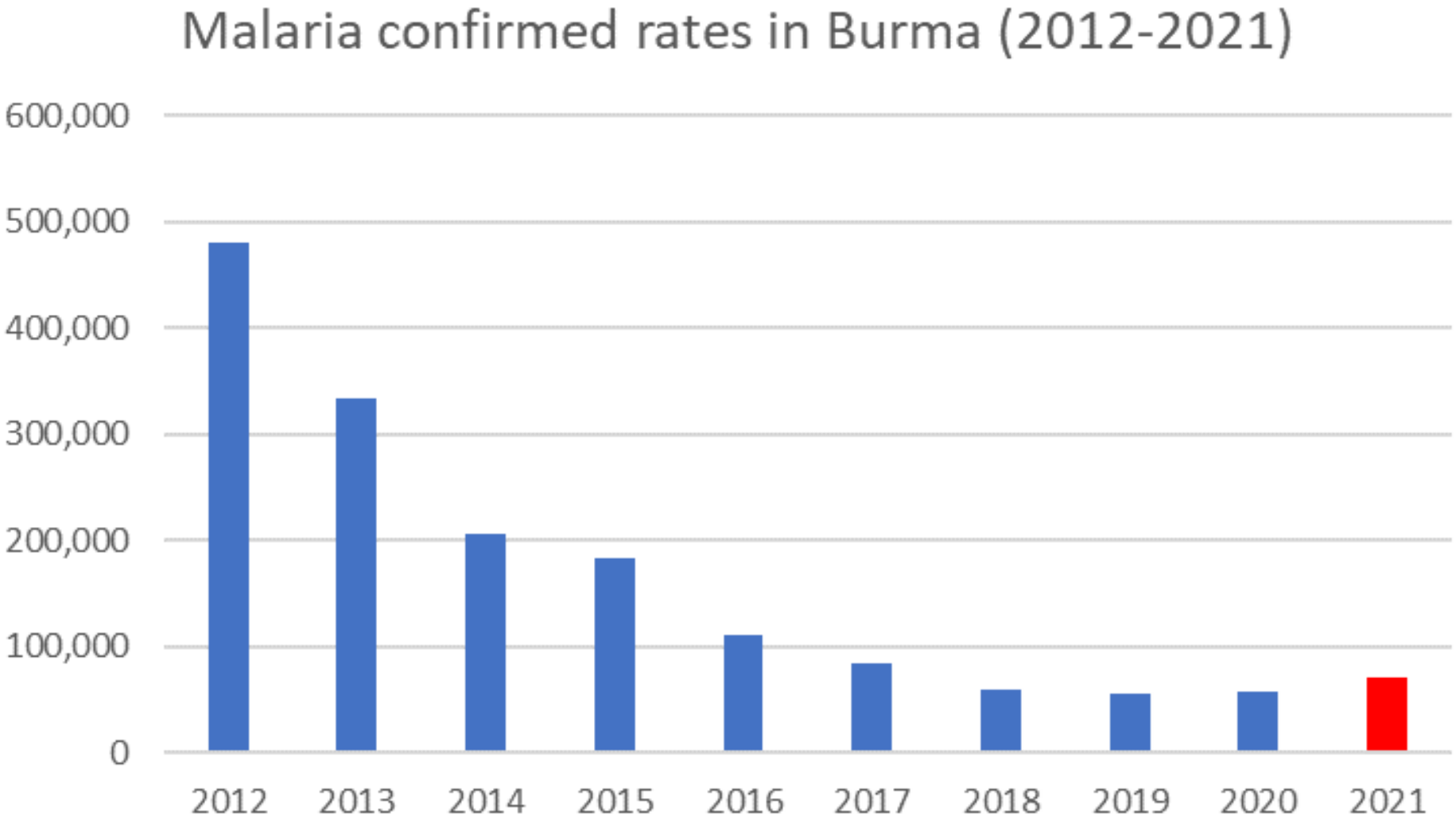
- To boost immunity

Turmeric

- for fast recovery

(Gupta, 2022)

What is happening to Malaria Elimination plan now in Myanmar?



From 58,132 cases in 2020 (PMI, 2022)
71,180 cases in 2021 (WHO, 2022)

Source PMI & WHO

Civil Disobedience Moments (CDM)

Numbers of Civil Disobedience Moments (CDM)

- About 60,000 health professionals joined CDM
- About 45,000 still involving in the movement

(Nyane & Gerin, 2022)

Violence Against Health Care in Myanmar after Military coup totals

- 492 reported incidents
- 564 Health Workers Arrested
- 126 Raids On Hospitals
- 36 Health Workers Killed

(Insecurity Insight, 2022)

Including

- Airstrikes and Artillery Fire by SAC
- Ambulances Attacks by SAC
- Arson or burning on Health Infrastructures by SAC
- Arrests of Health Workers by SAC

(Insecurity Insight, 2022)

- Attacks on Health Care by PDFs

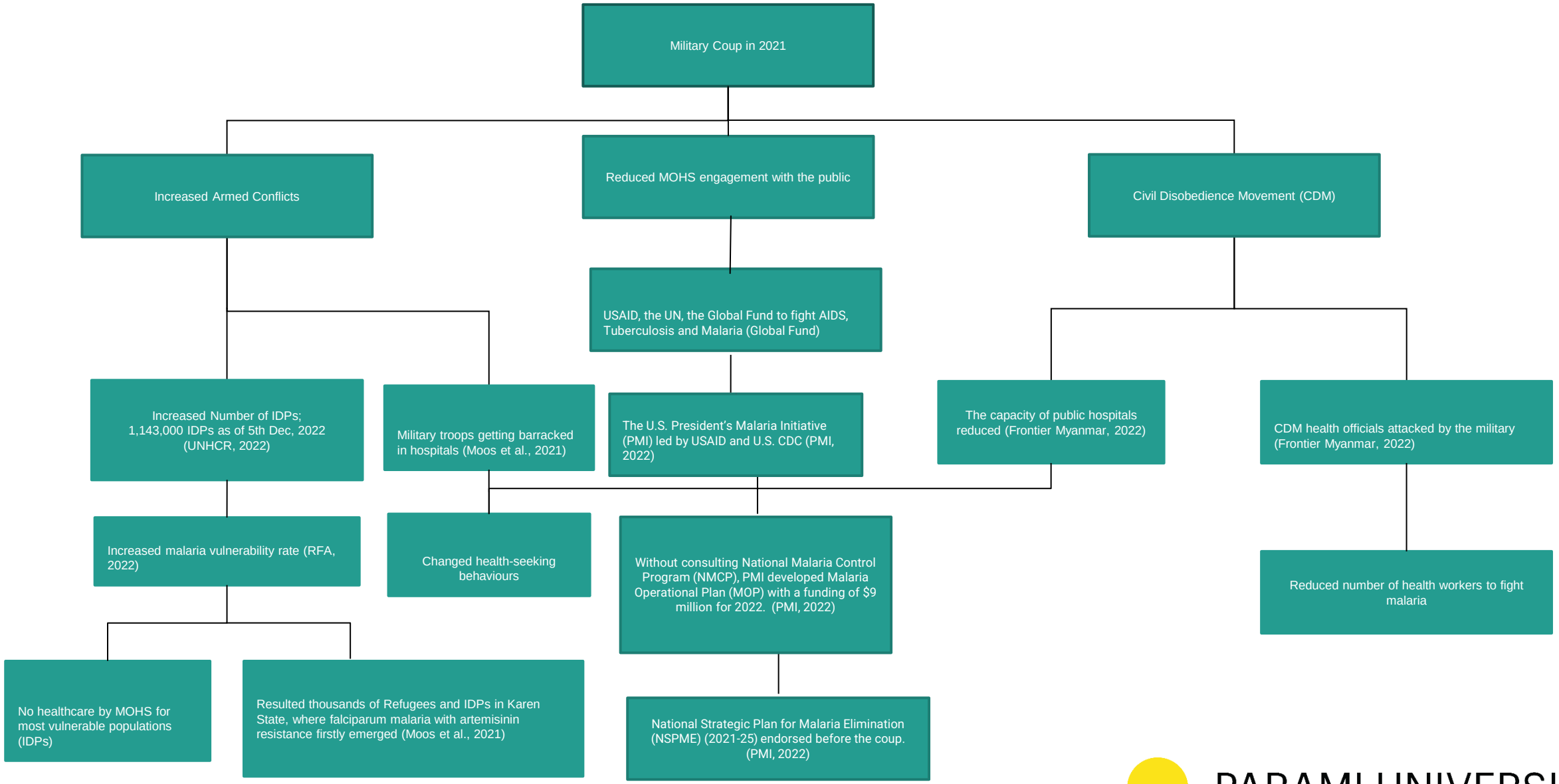
  (7 of the 81 reported incidents by exploiting or shelling hospitals occupied by SAC forces)

- Blockade of Medical Aid for Vulnerable and Displaced Populations by SAC

- Imprisoning of High-Profile Health Workers by SAC

(Insecurity Insight, 2022)

Myanmar's current situation table for malaria healthcare



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How can these people deal with malaria?

Available health providers for most vulnerable people (IDPs)

- The international communities and agencies
- some Thailand CSOs
- Regional civil society organizations (CSOs)
- Myanmar migrant-based community-based organizations (CBOs) in Thailand
- Ethnic Organizations based CSOs and Ethnic Health Organizations

(Aww, 2022)

Aww, M. O. (2022, April 29). *Effective third-sector actors in aid on the Thailand-Myanmar border - Myanmar*. ReliefWeb. Retrieved January 20, 2023, from https://reliefweb.int/report/myanmar/effective-third-sector-actors-aid-thailand-myanmar-border **(Aww, 2022)**

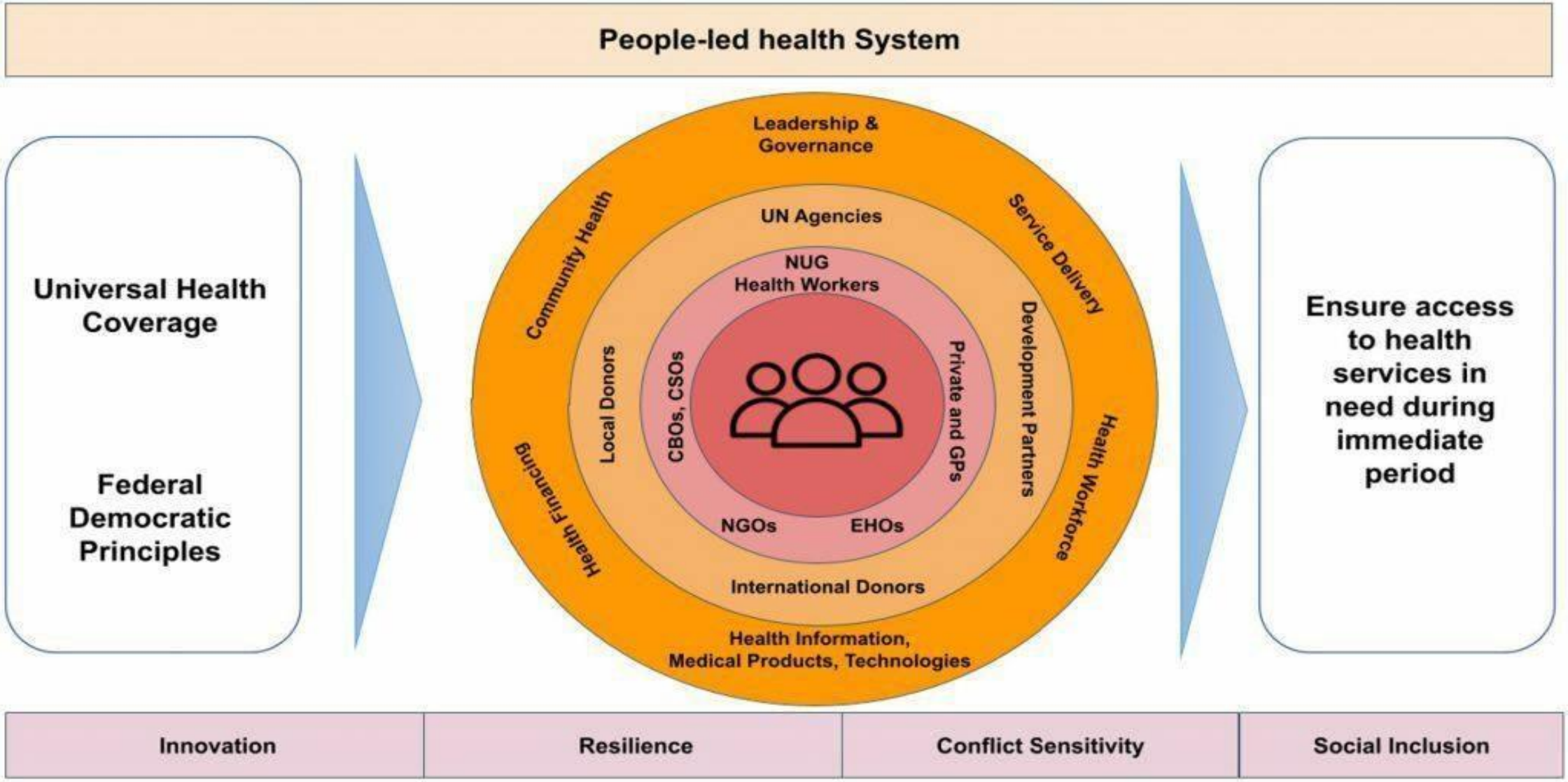
What International Communities need to do

- to engage with the right local partners, including local CBOs, CSOs, Ethnic organizations based health workers (EHOs)
- to urgently push cooperation between Thai government and ASEAN to accept new refugees in Thailand
- to ensure cross-border medical assistance

(Aww, 2022)

Aww, M. O. (2022, April 29). *Effective third-sector actors in aid on the Thailand-Myanmar border - Myanmar*. ReliefWeb. Retrieved January 20, 2023, from https://reliefweb.int/report/myanmar/effective-third-sector-actors-aid-thailand-myanmar-border **(Aww, 2022)**

NUG's Ministry of Health strategic healthcare plan



(NUG Myanmar, 2021)

Conclusion

- Recent elimination efforts done by the national government in collaboration with international support such as WHO, global funds, and private, and public entities during 2016-2020 prompted a significant decrease in the malaria burden.
- Recent political and social development leads to the destruction of prevention and control measures, which hinders the further elimination of malaria in Myanmar.
- Poor health knowledge that has not been fully addressed contributes to the higher misleading treatments when facing social, political, and economic difficulties recently.
- Current situation update of Myanmar indicates that there is a high potential for risks, if sufficient counter-functioning do not occur in time, in drug resistance and more zoonotic malaria, much less about eliminating malaria by 2030.

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Thank You

Malaria Members

Pann Ei Thwel
Soe Yadanar Htet
Thantlip Laomi
Thant Thaw Tun
The The Zuu Zin
Zin Wai Yan

Ei Mon Soe
Thu Ri Ya Tun
Htut Htet Naing
Hla Mong Ching
Khaing Thazin Phyoe
Myat Moe Kywe

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Questions and Answers